

Appl. No. 10/259,889  
Amdt. dated December 12, 2003  
Reply to Office Action of September 26, 2003

**Amendments to the Specification:**

Please delete the paragraph which begins on page 3, line 12 and ends on page 3, line 33.

Please delete the paragraph which begins on page 4, line 1 and ends on page 4, line 25.

Please delete the paragraph beginning on page 4, line 27, and ends on page 5, line 11.

Please add the following new paragraphs on page 3, line 12.

In a first aspect, the present invention seeks to provide a frequency synthesizer for producing an output signal based on an input signal and a predetermined control signal, the input signal having an input frequency, the output signal having an output frequency higher than the input frequency, the synthesizer comprising: a multiphase reference generator having means for generating a plurality of phase signals from the input signal, each phase signal having a frequency substantially equal to the input frequency, and each phase signal being out of phase with the other phase signals by a multiple of a predetermined time interval; a multiplexer having means for receiving the plurality of phase signals, and having means for selecting one of the plurality of phase signals as a multiplexer output signal; and a phase selector having means for receiving the predetermined control signal and the multiplexer output signal, and having means for generating a phase selector output signal based on the control signal and the multiplexer output signal; wherein the phase selector output signal is operatively coupled to the means for selecting one of the plurality of phase signals, and the multiplexer output signal is the frequency synthesizer output signal.

In a second aspect, the present invention seeks to provide a frequency synthesizer for producing an output signal from an input signal based on a predetermined control signal, the input signal having an input frequency, the output signal having an output frequency higher than the input frequency, the synthesizer comprising: a multiphase

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reference generator having means for generating a plurality of phase signals from the input signal, each phase signal having a frequency substantially equal to the input frequency, and each phase signal being out of phase with the other phase signals by a multiple of a predetermined time interval;

a multiplexer having means for receiving the plurality of phase signals, having means for selecting at least two of the plurality of phase signals, and having means for blending/interpolating the at least two of the plurality of phase signals into a multiplexer output signal; and a phase selector having means for receiving the predetermined control signal and the multiplexer output signal, and having means for generating a phase selector output signal based on the control signal and the multiplexer output signal; wherein the phase selector output signal is operatively coupled to the means for selecting one of the plurality of phase signals, and the frequency synthesizer output signal is the multiplexer output signal.

In a third aspect, the present invention seeks to provide a frequency synthesizer comprising: a phase generator having means for receiving an input signal having a reference frequency and means for generating a plurality of phase signals having a frequency substantially equal to the reference frequency, each phase signal being out of phase with the input signal by a multiple of a predetermined time interval; a multiplexer having means for receiving the plurality of phase signals, and having means for selecting one of the plurality of phase signals as a multiplexer output signal; a binary digital accumulator having a clock input, an accumulator input and an accumulator output, the multiplexer output signal being operatively coupled to the clock input; and a storage means for storing a predetermined control word, the storage means being operatively connected to accumulator input, wherein the predetermined control word is added by the binary digit accumulator to a stored value on every cycle of the multiplexer output the multiplexer output is selected by the selector output and is based on at least one of the plurality of phase signals and each successive

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multiplexer output leads its predecessor by a multiple of the predetermined time interval.

In a fourth aspect, the present invention seeks to provide a method of synthesizing an output signal from based on an input signal and a predetermined control signal, the input signal having an input frequency, the output signal having an output frequency higher than the input frequency, the method comprising the steps of:

- (a) generating a plurality of phase signals from the input signal;
- (b) selecting one of the plurality of phase signals as a selected phase signal;
- (c) generating the output signal from the selected phase signal;
- (d) adding the predetermined control word to a stored value to generate a select signal based on the selected phase signal;
- (e) selecting one of the plurality of phase signals as the selected phase signal based on at least a portion of the select signal;
- (f) repeating steps (c) to (e) for every cycle of the output signal.